Domestic Vanadium Deposits

Why in News

A recent exploration by **Geological Survey of India (GSI)** has found reserves of **Vanadium in Arunachal Pradesh.**

GSI is an **attached office to the Ministry of Mines.**

Key Points

- **About Vanadium:**
  - Vanadium is a **chemical element** with the **symbol V.**
  - It is a scarce element, hard, silvery grey, ductile and malleable **transition metal** with **good structural strength.**

    Transition metals are all the elements in groups 3–12 of the periodic table. These are superior conductors of heat as well as electricity.
  - **Ores:**

    Patronite, vanadinite, roscoelite and carnotite.
  - **Uses:**
    - Vanadium is used primarily as an alloying element in the **Iron & Steel Industry** and to some extent as a **stabiliser in titanium and aluminium alloys used in the aerospace Industry.**
    - Modern applications of vanadium include its use as **vanadium secondary batteries for power plants** and **rechargeable Vanadium Redox Battery (VRB) for commercial applications.**
    - Vanadium alloys are used in **nuclear reactors** because of **vanadium's low neutron-absorbing properties.**

- **Reserves of Vanadium in Arunachal Pradesh:**
  - Concentrations of vanadium have been found in the **palaeo-proterozoic** (era) **carbonaceous phyllite rocks** in the **Depo and Tamang areas** of Papum Pare district in Arunachal Pradesh.
    - **Phyllite** is a fine-grained **metamorphic rock** formed by the recrystallization of fine-grained, parent sedimentary rocks, such as mudstones or shales.
    - Sedimentary rocks containing significant enrichment in organic matter over average sediments are called **carbonaceous sedimentary rocks.**
  - There are **other potential sites in various districts** in Arunachal Pradesh.
  - This is the **first report of a primary deposit of vanadium in India.**
- **Current Scenario:**
  - India is a **significant consumer of vanadium,** but is not a primary producer of the strategic metal.

    According to data provided by the GSI, India consumed **4%** of total **global production of Vanadium in 2017.**
  - It is recovered as a **by-product from the slag** of processed vanadiferous magnetite (iron) ores.

    Slag is the **glass-like by-product left over after** a desired metal has been separated (i.e., smelted) from its **raw ore.**
- **Global Reserves:**

  The largest deposits of Vanadium are in **China, followed by Russia and South Africa** respectively.

Source:TH